




Managing Wet Weather with Green Infrastructure

Municipal Handbook

Funding Options

This Green Infrastructure Municipal Handbook is the product of collaboration among many agencies, organizations and individuals. The following organizations are primarily responsible for coordinating the development of this handbook:

American Rivers
Association of State and Interstate Water Pollution Control Administrators
National Association of Clean Water Agencies
Natural Resources Defense Council
The Low Impact Development Center
U.S. Environmental Protection Agency

For more information on green infrastructure planning, implementation, and partnership opportunities, visit the green infrastructure website at:
www.epa.gov/npdes/greeninfrastructure

September 2008

Front Cover Photos
Top: rain garden; permeable pavers; rain barrel; planter; tree boxes.
Remainder: Green Street in Portland; Mt. Tabor rain garden in Portland; Chicago City Hall green roof; planter inlet in Portland.





Managing Wet Weather with Green Infrastructure

Municipal Handbook: Funding Options

Table of Contents





Introduction

Purpose of this Handbook

This municipal handbook has been developed to help local officials implement green infrastructure for managing wet weather in their communities. The handbook is being produced in sections, with each new element being released as it is completed. The final compilation is intended to be a comprehensive reference manual with technical guidance covering many aspects of green infrastructure implementation. Topics to be addressed include:

- Funding Options
- Codes & Ordinances
- Selection & Application of Technologies
- Performance & Cost Factors
- Site Plan & Design Review Specifications
- Operation & Maintenance Needs
- Tracking & Evaluation Protocols
- Cost Savings and Economic Benefits
- Incentive Programs
- Education & Outreach Strategies

Background

Many communities, ranging from highly developed cities to newly developing towns, are looking for ways to assure that the quality of their rivers, streams, lakes, and estuaries is protected from the impacts of development and urbanization. Traditional development practices cover large areas of the ground with impervious surfaces such as roads, driveways, and buildings. Once such development occurs, rainwater cannot infiltrate into the ground, but rather runs offsite at levels that are much higher than would naturally occur. The collective force of such rainwater scours streams, erodes stream banks, and can cause large quantities of sediment and other entrained pollutants to enter the water body each time it rains.

In addition to the problems caused by stormwater and nonpoint source runoff, many older cities (including many of the largest cities in the United States), have combined sewage and stormwater pipes which periodically and in some cases frequently overflow due to precipitation events. In the late 20th century, most cities that attempted to reduce sewer overflows did so by separating combined sewers, expanding treatment capacity or storage within the sewer system, or by replacing broken or decaying pipes. However, these practices can be enormously expensive and take decades to implement. Moreover, piped stormwater and combined sewer overflows ("CSOs") may also, in some cases, have the adverse effects of upsetting the hydrological balance by moving water out of the watershed, thus

bypassing local streams and ground water. Many of these events also have adverse impacts and impose costs on source water for municipal drinking water utilities.

A set of techniques, technologies, approaches and practices—collectively referred to as "green infrastructure"—can be used to eliminate or reduce the amount of water and pollutants that run off a site and ultimately are discharged into adjacent water bodies. As cities move towards sustainable infrastructure, green infrastructure can be a valuable approach.

"Green infrastructure" is a relatively new and flexible term, and it has been used differently in different contexts. Thus, to date, there is no universally established definition of the term. For example, Benedict and McMahon, in their book *Green Infrastructure* (Island Press, 2006), have defined it broadly as "an interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to people and wildlife." However, for the purposes of our efforts to implement the Green Infrastructure Statement of Intent (discussed below), we intend the term "green infrastructure" to generally refer to systems and practices that use or mimic natural processes to infiltrate, evapotranspirate (the return of water to the atmosphere either through evaporation or by plants), or reuse stormwater or runoff on the site where it is generated.

What is Green Infrastructure?

Green infrastructure is a combination of management approaches and technologies that utilize, enhance and/or mimic the natural hydrologic cycle processes of infiltration, evapotranspiration and reuse. Green infrastructure approaches currently in use include green roofs, trees and tree boxes, rain gardens, vegetated swales, pocket wetlands, infiltration planters, permeable pavements, vegetated median strips, reforestation/revegetation, and protection and enhancement of riparian buffers and floodplains. Green infrastructure can be used almost anywhere soil and vegetation can be worked into the urban or suburban landscape. Green infrastructure also includes decentralized harvesting approaches, such as the use of rain barrels and cisterns to capture and reuse rainfall for watering plants or flushing toilets. These approaches can be used to keep rainwater out of the sewer system so that it does not contribute to a sewer overflow and also to reduce the amount of untreated runoff discharging to surface waters. Green infrastructure also allows stormwater to be absorbed and cleansed by soil and vegetation and either reused or allowed to flow back into groundwater or surface water resources. Green infrastructure techniques can often be used in lieu of or in conjunction with more traditional "hard" infrastructure components (such as tunnels, pipes, and storage basins) depending on the site-specific factors of a given project.

In managing wet weather, green infrastructure practices, like all types of practices, need to be implemented at multiple scales: site, neighborhood, and regional or watershed. The most beautifully designed site, even if multiple green infrastructure practices are used, may actually result in an overall increase in impervious surfaces and thus stormwater discharges, if new or expanded roads, parking lots and commercial development are needed to serve it. For that reason, we include approaches such as infill, redevelopment and preserving natural areas in our suite of green infrastructure approaches. For more information on specific green infrastructure practices and how they function, visit: http://www.epa.gov/npdes/greeninfrastructure.

Green Infrastructure Benefits

Green infrastructure has a number of environmental and economic benefits in addition to reducing the volume of sewer overflows and runoff.

- *Cleaner Water* – Vegetation, green space and water reuse reduce the volumes of stormwater runoff and, in combined systems, the volume of combined sewer overflows, as well as reduce concentrations of pollutants in those discharges.

- *Enhanced Water Supplies* – Most green infiltration approaches involve allowing stormwater to percolate through the soil where it recharges the groundwater and the base flow for streams, thus ensuring adequate water supplies for humans and more stable aquatic ecosystems. In addition, capturing and using stormwater conserves water supplies.

- *Cleaner Air* – Trees and vegetation improve air quality by filtering many airborne pollutants and can help reduce the amount of respiratory illness. Transportation and community planning and design efforts that facilitate shorter commute distances and the ability to walk to destinations will also reduce vehicle emissions.

- *Reduced Urban Temperatures* – Summer city temperatures can average 10ºF higher than nearby suburban temperatures. High temperatures are also linked to higher ground level ozone concentrations. Vegetation creates shade, reduces the amount of heat absorbing materials and emits water vapor – all of which cool hot air. Limiting impervious surface and using light colored impervious surfaces (e.g., permeable concrete) also mitigate urban temperatures.

- *Moderate the Impacts of Climate Change* – Climate change impacts and effects vary regionally, but green infrastructure techniques provide adaptation benefits for a wide array of circumstances, by conserving and reusing water, promoting groundwater recharge, and reducing surface water discharges that could contribute to flooding. In addition, there are mitigation benefits such as reduced energy demands and carbon sequestration by vegetation.

- *Increased Energy Efficiency* – Green space helps lower ambient temperatures and, when incorporated on and around buildings, helps shade and insulate buildings from wide temperature swings, decreasing the energy needed for heating and cooling. Further, diverting stormwater from wastewater collection, conveyance and treatment systems reduces the amount of energy needed to pump and treat the water. Energy efficiency not only reduces costs, but also reduces generation of greenhouse gases.

- *Source Water Protection* – Green infrastructure practices provide pollutant removal benefits, thereby providing some protection for both ground water and surface water sources of drinking water. In addition, green infrastructure provides groundwater recharge benefits.

- *Community Benefits* – Trees and plants improve urban aesthetics and community livability by providing recreational and wildlife areas. Studies show that property values are higher when trees and other vegetation are present.

- *Cost Savings* – Green infrastructure may save capital costs associated with paving, creating curbs and gutters, building large collection and conveyance systems, and digging big tunnels and centralized stormwater ponds; operations and maintenance expenses for treatment plants, pumping stations, pipes, and other hard infrastructure; energy costs for pumping water around; cost of treatment during wet weather; and costs of repairing the damage caused by stormwater, such as streambank restoration.

Funding Options

Introduction

Securing adequate, sustainable sources of funding for managing wet weather presents a significant challenge for towns and cities across the United States, and financial constraints frequently hinder the implementation of effective programs and practices at the local level. This situation is often especially true for green infrastructure approaches, not necessarily because they are more expensive than traditional management approaches (in fact often they are less expensive), but because they do not necessarily fit existing funding frameworks. In many cases, green infrastructure is simply another item on the community "to-do" list that can not (and will not) be addressed without developing alternative funding mechanisms.

Fortunately, a growing number of communities have overcome financial barriers with funding strategies that are sustainable and effective. Many communities pay for green infrastructure projects by drawing from general funds, while others set up new fees, taxes and other directed charges to help pay for public infrastructure repairs and improvements. Often, these fees are applied to new development and other land use alterations and may appear as plan review and permitting fees, or special assessment fees that discourage building in particular locations – like green fields – by exacting an additional charge for projects located in sensitive areas. Some communities are charging private properties a "fee-in-lieu" of on-site water quality treatment, wherein developers no longer implement on-site water quality treatment practices, but instead pay into a fund that the municipality can use to finance green infrastructure projects in priority areas. Capital cost recovery fees, impact fees, and real estate taxes are further examples of the many different ways that local governments are generating reliable funding for green infrastructure practices that will result not only in better stormwater management, but in a wide range of additional community benefits as well.

This chapter identifies and discusses the two most common funding options communities are using for green stormwater infrastructure – stormwater fees and loan programs.

A third source of funding – grant programs – is also available in limited amounts to support green infrastructure projects. The amount of grant money currently available on a national basis is only sufficient enough to fund small, local projects, and is not enough to sustain large multi-year wet weather programs. Grants, such as those provided under Clean Water Act Section 319 or through the Department of Housing and Urban Development's Community Development Block Grant Program (CDBG), can be useful in building demonstration projects or as seed money for building local political and community support for green infrastructure practices. However, grant money is not considered a reliable, long-term source of funding for establishing sustainable green infrastructure policies or programs.

A number of national groups are currently working to increase the amount of grant money available for green infrastructure projects, and if and when such funds become available this chapter will be updated. However, some grant money may be currently available for communities interested in funding small demonstration projects, and information on existing grant programs is available at http://www.epa.gov/npdes/greeninfrastructure.

Stormwater Fees

What is a stormwater fee?

Stormwater fees are used to generate a revenue stream to address the increasing investment most communities will have to make to control both combined sewer overflows and stormwater runoff. Some municipalities require additional funding for the new infrastructure required to meet the demands of growth and development, while other, often older communities need extra revenue to repair and maintain existing storm sewer systems. Smart growth planning and updated development codes can help offset the financial impact of new infrastructure costs, but most municipalities have extensive off-site stormwater systems that require ever increasing public investment.

Why have user fees as opposed to other collection methods?

Stormwater user fees are often considered a fair, equitable method for charging the people that benefit from stormwater infrastructure. Traditionally, the cost of stormwater management was paid for through general tax funds (such as a property tax) or was included as a line-item on monthly water bills. However, stormwater user fees are increasingly used to direct the costs for stormwater management towards those properties that generate the most runoff.

In addition to being more equitable, stormwater fees are also easier for municipalities to set-up and implement. In many communities, new taxes require a vote of approval by the public, while a fee is a charge that municipalities have the authority to leverage for the services they provide. Also, many properties can be exempt from taxes. In Washington DC, for example, the federal government contributes to 35% of the District's overall impervious surfaces. These properties are exempt from paying a stormwater tax, but could be required to pay a fee for stormwater management services, just as they pay for electricity and water.

Minneapolis Central Library Green Roof. Image courtesy The Kestrel Design Group, Inc.

Fee Collection

As a community decides to create a stormwater user fee, it is important to determine which entity will be responsible for collecting and managing the funds that are generated. Most municipalities set up a new stormwater utility to manage the billing process and incoming revenue. The utility may be managed through an enterprise fund or special account separate from general funds. If an independent entity is not created, existing departments, such as a department of environment or department of public works, are often tasked with the responsibility of managing fee collection and spending. For ease of collection, the stormwater fee can be added to water, sewer or utility bills; however a few cities charge the user fee as a monthly or annual tax. In San Jose for

instance, the Santa Clara County Tax Collector's Office collects the Storm Sewer Service Charge through the annual property tax roll.

It is equally important to consider how revenue from the fee will be spent. By creating new utilities, municipalities are able to control and prioritize stormwater projects on city-owned property. User fee revenue can be used for a wide variety of purposes, but most communities allocate these funds to demonstration projects, capital improvements, and operations and maintenance of stormwater facilities.

An increasingly common method for calculating a stormwater user fee is an impervious surface based billing system. Because runoff from impervious areas is the primary contributor to the storm sewer system, this is seen as a more equitable determination for fees than a meter-based fee, which charges by water consumption. For example, a parking lot uses no potable water but creates significantly more runoff than a small restaurant that consumes a large amount of potable water.

The calculation can differentiate by zoning or property use types. Currently, municipalities are setting flat rates for residential units because limitations in technology make it administratively costly to calculate actual imperviousness for each residential lot throughout the city. Instead of actual impervious lot calculations, cities will set up equivalent residential unit (ERU) or equivalent stormwater unit (ESU) charges. These approximate measures provide differential rates based on total lot size, which gets closer to actual values of impervious surface calculations. In Minneapolis a three-tiered system differentiates between overall parcel sizes of single family properties, with a standard ESU at 1530 square feet of imperviousness which results in a charge of $8.72 per month.

Table 1: Minneapolis's Stormwater Charge for Single-Family Residential Properties

Tier	ESU	Stormwater Charge
High	1.25	$10.90
Medium	1.00	$8.72
Low	0.75	$6.54

Non-residential properties vary much more in gross size and total imperviousness than residential parcels and are more frequently based on their actual contribution of stormwater runoff. Cities such as Philadelphia, Pennsylvania, Lenexa, Kansas and Portland, Oregon calculate user fees for commercial, multi-family residential and industrial properties by their total lot size and percentage of imperviousness. These rates are measured through GIS and flyover image data that accurately accounts for the stormwater runoff inputs of these large customer parcels.

Fee Discounts and Credits

When incentives are tied to stormwater fees, they encourage retrofits of existing properties and implementation of green infrastructure in new developments. Fee discounts and credits provide an opportunity for property owners to reduce the cost of their stormwater fees by using green infrastructure techniques that limit impervious cover and reduce the amount of runoff generated. The public system clearly benefits when property owners manage stormwater runoff on site. If less water enters the sewer system, less money needs to be spent on treatment, maintenance, and operation expenditures. Further, discounts and credits support the fee-for-service system because property owners can reduce the amount they pay by reducing the service they receive.

There are a number of options for reducing fees, but there must be a balance between the base charge and the type of incentive that is used. The fee must be costly enough to encourage avoidance, while credit standards must be reasonable enough that owners want to seek the credit in lieu of paying the fee in full.

Before setting the credit standard, municipalities should first determine the types of stormwater management goals they wish to achieve (e.g. reduce impervious cover, increase infiltration, increase green roofs, etc.). Once these management goals are defined, officials must then decide how to credit private property owners for the action(s) being incentivized. Table 2 outlines several common stormwater management goals and identifies the mechanisms and processes that can be used to meet these goals. Some cities give a percent discount for level of performance, primarily for stormwater quantity reduction and in lesser cases for pollution reduction. Discounts are also offered for impervious surface reductions, whether for total area or by the square foot. Finally, credits can be based on particular practices, such as rain gardens, green roofs or even tree canopy. Portland, Oregon, for instance, gives specific credits for sites with ecoroofs or trees over 15 feet tall. Credit amounts vary based on the practice and the goals the municipality has for private stormwater management.

Depending on the billing cycle, these discounts can be incorporated into the next charge or retroactively for past payment. In almost all cases, the fee reduction is permanent, especially for impervious surface reductions, but may be contingent on proper maintenance for credits granted for specific practices or tree planting/preservation.

Table 2: Framework for Stormwater Fee Discount Programs

Goal of Discount	Mechanism for Fee Reduction	Process for Implementation
Reduce Imperviousness	• Percent fee reduction • Per-square-foot credit	• Percent reduction in imperviousness • Square feet of pervious surfaces
On-site Management	• Percent fee reduction • Quantity/Quality credits (performance-based)	• List of practices with various credits • Total area (square feet) managed
Volume Reduction	• Percent fee reduction • Performance-based quantity reduction	• Percent reduction in imperviousness • Performance-based • Total area (square feet) managed • Practices based on pre-assigned performance values
Use of Specific Practices	• Percent fee reduction • One time credit	List of practices with various credits

Drawbacks and Limitations

Stormwater fees can be a fair, efficient way for communities to recover the cost of maintaining and improving stormwater infrastructure. However, to be an effective and sustainable source of funding, stormwater fees must be thoroughly planned and thoughtfully implemented. When new fees are hastily imposed, they can lead to unexpected consequences that often cause more harm than good.

When charging the people that use and benefit from stormwater infrastructure, it is critical that the greatest costs are directed towards those who create the most runoff. Following this logic, most stormwater fees should be structured so that properties with the large amounts of impervious area – such as commercial and industrial facilities – pay higher fees than residential and other small-meter properties which generally have less impervious cover.

When too much of the cost burden is placed on residential customers, stormwater fees can quickly lose traction and support. In Detroit, for example, an increase in residential stormwater fees left many of the city's low-income families unable to pay their monthly water bill. As a result, many of these residents had their water turned off. This was clearly not the intent of the city's stormwater fee, but it serves as an example of what can happen when the cost allocation of stormwater fees is not carefully thought out. To address this problem, cities have developed a variety of assistance programs to help low-income customers pay their stormwater bills. The City of Portland, Oregon, for example, offers bill discounts, crisis vouchers (good for up to $150), and zero interest loans for qualified customers.

In addition to ensuring a fair cost allocation, stormwater fees must also provide enough capital to maintain and enhance existing stormwater infrastructure. On the one hand, a stormwater fee that is too high will likely meet opposition from overburdened customers. On the other hand, a stormwater fee that is too low is virtually useless. The District of Columbia, for example, charges a $7 annual stormwater fee to all single-family homes – a charge that covers only a fraction of the District's actual infrastructure costs. It is important to remember that stormwater fees are designed to offset the costs of infrastructure expenditures. To be truly effective, these fees must therefore generate enough funds to pay for infrastructure maintenance and upgrades.

Tanner Springs Park in Portland, Oregon includes a constructed wetland for managing runoff from nearby buildings.

Case Study: Philadelphia, Pennsylvania

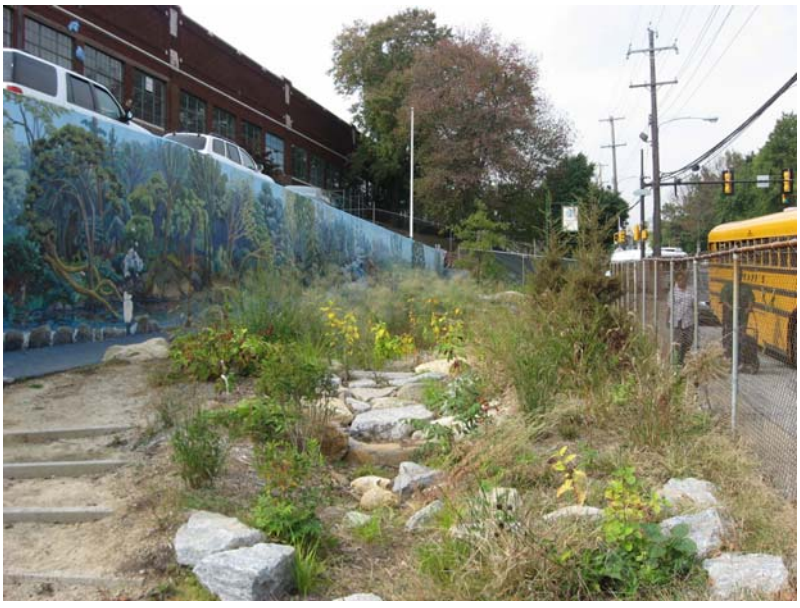
Like many large cities, Philadelphia has witnessed a significant increase in stormwater management costs over the past several years. In an effort to comply with state and federal regulations, the city has

incurred substantial capital expenditures and operating costs to maintain its aging stormwater infrastructure. In addition, the city will need to invest hundreds of millions of dollars over the next decade to reduce the frequency of combined sewer overflows.

To help offset these tremendous costs, the Philadelphia Water Department recently decided to revise its stormwater fees. For years, the Water Department recovered the costs of operating and maintaining stormwater infrastructure through a service charge collected from metered customers. Under this system, properties with larger water meters - such as commercial and industrial facilities - paid a higher service charge. While this fee structure may seem reasonable, it has one major drawback in that non-metered properties such as parking lots and utility right-of-ways have not had to pay a stormwater fee.

The Water Department convened a Citizens Advisory Council to make recommendations for improving the city's stormwater fee. This group of stakeholders recognized that impervious cover is the primary factor in determining the amount of runoff a property will generate. As a result, 80 percent of the city's new stormwater fee is based upon a property's impervious area, with the remaining 20 percent based upon the property's gross area. In this way, stormwater fees will reach non-metered customers such as rail lines, parking lots and utility right-of-ways that account for significant impervious space (and stormwater runoff) within the city.

Philadelphia offers a stormwater fee discount for customers who reduce impervious cover using green infrastructure practices, including rain gardens, infiltration trenches, porous pavements, vegetated swales, and green roofs. If a property is retrofitted with any of these features, the Water-Department will re-calculate that property's stormwater fee based on the 80/20 impervious/gross area formula.



Philadelphia's new impervious-based fee encourages retrofits of large impervious sites, such as the Wissahickon Charter School (above), which now intercepts all parking lot runoff with rain gardens.

The Water Department is planning to implement this new fee among its large-meter non-residential customer base over a four year period beginning in FY 2009. However, for residential and other small-meter customers, the City recognized that a detailed analysis of each of the City's 450,000 residential properties would be administratively complex and have chosen not to implement this level of detail for an impervious-based billing program at this time. As a result, all residential properties have been combined and treated as a single land parcel with the total costs of the 80/20 calculation divided equally among all households. Under this new fee system, stormwater costs will be spread out and shared over a larger customer base, and calculations show that the majority of customers will see a reduction or otherwise minor impact on the stormwater component of their water and sewer bills. For those customers that experience a noticeable increase in their fees, the Water

Department will provide site-design recommendations that will decrease the amount of impervious area on their properties and thus decrease their stormwater fees.

For more information about Philadelphia's new stormwater fee, contact:

Christopher S. Crockett, Ph.D., P.E.
Director - Planning & Research
Philadelphia Water Dept.
(215) 685-6368
Chris.Crockett@phila.gov

Case Study: Portland, Oregon

The City of Portland has one of the most well-developed stormwater fee and discount programs in the nation. The City Council first established a stormwater utility charge based on impervious surfaces in 1977 and has continued to update the program as local regulations and state funding sources change. The most drastic change came in 2000 when the City Council adopted a new split charge on the utility bill, with 35% for on-site and 65% for off-site stormwater management. The on-site portion is based on the pollutant loads and volumes created by a given property's impervious surfaces, while the off-site portion of the fee covers costs for street drainage, combined sewers and other conveyance and disposal infrastructure. Portland currently has the highest average monthly fee for stormwater in the U.S., at $16.82 per month based on a rate of $7.22 per 1,000 square feet of imperviousness.

At the same time that the new split stormwater charge appeared on utility bills in 2000, the City adopted a discount program for the on-site portion of the fee. Itemization of the bill was motivated by a desire to improve public awareness about stormwater and the role of individual property owners and runoff created by impervious surfaces like roofs and parking areas. It also set a convenient cap for the stormwater discount so that the program creates the revenue necessary to cover costs for large infrastructure maintenance and updates, such as several ongoing combined sewer overflow (CSO), or "Big Pipe" projects.

Clean River Rewards is the most recently updated version of the stormwater discount program. Launched in 2006, it provides discounts to property owners based on the extent and effectiveness of on-site stormwater management practices that control flow rate, pollution and disposal. Because the on site portion of the stormwater bill is only 35%, this is the maximum discount received for full on site management. Different forms and requirements apply to two ratepayer categories, either single-family homes or commercial, industrial, and multi-family homes. The process for registering is very simple and straightforward, can be done entirely online and requires only the property owner's signature for certification.

Single-family homes are given a stormwater discount based on roof runoff management. Property owners are given a checklist to choose what type of on-site management qualifies them for the discount. For example, different percentage discounts are given for disconnecting downspouts and depending on the type of practice collecting runoff, such as a drywell, swale or rain barrel. Partial credit is also given for ecoroofs, four or more trees over 15 feet tall and for properties with less than 1,000 square feet of imperviousness. To date, over 35,000 residential participants have registered for Clean River Rewards.

Commercial, industrial, and multi-family home discounts are based on runoff managed not only for roof areas, but for paved areas as well. Property owners are asked to calculate the square footage of impervious area that drains to an acceptable stormwater management practice listed on the form. Over 2,000 commercial, industrial and multi-family home properties have registered for the discount program.

Bureau of Environmental Services staff are granted access to inspect properties and verify that stormwater facilities are properly maintained and operated. The City imposes civil penalties and recovers stormwater discounts in situations where management practices are not in proper working order. Staff members also provide technical assistance to a range of property types, with special attention to schools, hospitals, nonprofits and government properties to help them become eligible for the discount. Overall participation is expected to reach 110,000 of the 176,000 ratepayers in Portland. For more information on Portland's stormwater charge and Clean River Rewards, contact:

Dan Vizzini
Portland Bureau of Environmental Services
Environmental Intergovernmental Relations
(503) 823-4038
danv@bes.ci.portland.or.us

The Oregon Convention Center saves $15,600 annually on its stormwater bill by managing roof runoff in rain gardens along the side of the building.

Case Study: Toledo, Ohio

The City of Toledo implemented their stormwater utility as a way to pay for the increasing costs of managing and maintaining their sewer system. In 1999, the City created a utility that charged fees based upon the amount of impervious surface area of all the landowners within their jurisdiction. To establish a framework for the utility, city officials worked with the University of Toledo and private consultants to measure the amounts of impervious surface within the city.

In 2001, the city also instituted a stormwater fee discount program as a way for non-residential property owners to reduce their stormwater service fee. The credit program was developed based on research and evaluation of 15 other communities with existing Stormwater Utilities. The program identifies several different practices that property owners can install to reduce stormwater runoff and pollution and establishes different discount percentages for each practice. For example, a property owner can receive a 10% discount for brownfield reuse, and a 30% discount for installing a forested buffer or swale. The current guidelines of the program are as follows:

- Credits are available only for non-residential property owners who pay a stormwater fee.
- The maximum credit receivable is 50%.

- Credit is awarded only for fully constructed and functional practices.
- The credit is applicable only to the impervious area that is controlled by the practice.

Currently, the credit program is evolving and being refined. The city wants to add rain gardens and bioretention units as credit worthy practices, and public schools are working with the city and other partners to install bioretention on school facilities as a means of receiving stormwater credits.

For more information on Toledo's utility, contact:

Patekka Bannister
City of Toledo
Department of Public Utilities
Division of Environmental Services
(419) 936-3774
Patekka.Bannister@toledo.oh.gov

Case Study: Lenexa, Kansas

Lenexa, Kansas is a growing suburb in metropolitan Kansas City that faces increasing pressure from the impacts of new development, including more homes, roads and other impervious surfaces that create more runoff volume. In an effort to protect local water quality, as well as prevent flooding and improve the quality of life for local residents, Lenexa's 20 year comprehensive plan, Vision 2020, outlines a number of policies and programs to protect land from future development and introduce new green infrastructure practices that limit imperviousness and manage runoff on site. Part of the 2020 process involved establishing sustainable funding at the local level to purchase lands for open space preservation and to pay for new and expanded stormwater management programs.

Lenexa is leveraging funds to incorporate green infrastructure into major capital projects, ranging from updates to existing wet weather infrastructure to development and redevelopment of roads, parks and other facilities. Funding for these major projects and for the day-to-day staffing and management of a watershed protection program, Rain to Recreation, comes from four primary sources:

1. *Sales Tax*

Lenexa taxpayers voted for a ballot in 2000 to add a 1/8 of a cent sales tax levy to support building stormwater facilities that repair existing infrastructure problems and protect against future flooding events. The sales tax passed by a 78% margin. It generated $7.2 million between 2000 and 2005 and sunsets in 2010. The sales tax levy supports a frontloaded capital improvement program.

2. *Utility Charge*

Lenexa established a stormwater utility and charge to provide comprehensive sustainable funding for its new programs. The stormwater utility charge is based on the amount of runoff surface on each parcel of land. Each property is charged $5.50 (in 2008) per equivalent dwelling unit (EDU), which is measured at 2750 square feet, or about the average runoff surface area of a house with a driveway. The minimum charge for stormwater management for all residential properties is one EDU. Commercial and non-residential properties are charged based upon amount of storm water runoff generated and rates are calculated by dividing total runoff surface area by the number of square feet in an EDU (2750) to more closely charge these larger properties by runoff contributions to the public system. The stormwater utility charges are collected through annual property tax roles administered by the County. The City offered a 25% credit for the first three years of the utility to those rate payers that converted

their dry bottom detention to wet bottom detention to encourage greater water quality improvement from existing basins. There was no demonstrated interest at the time and thus the credit was discontinued to date.

3. *New Development Charge*

Lenexa, Kansas uses revenue from their stormwater utility fee to purchase land that protects natural resources and serves as public park and educational areas.

In 2004, the Lenexa City Council adopted the Systems Development Charge to require new development to pay a one-time fee at the time of building permit as a means for recovering costs for capital improvement activities within the Rain to Recreation program so that growth pays for growth. Although all public projects incorporate water quality treatment and protection into all new city facilities, the focus of this fee is to systemically address water quantity needs through construction of regional retention facilities and necessary capital improvements to streamways, many of which are protected by the City's stream setback ordinance. Some other cities refer to this as a "fee in lieu" of requiring developers to construction detention areas on new development sites (and in this case detention of the 100 year (1% storm) event), and instead directs the money towards projects that have wider public benefit beyond just water quality treatment. Because new developments are contributing to the problems of water quantity, Lenexa has required that they pay into the pool of funds used to build new projects, including the construction of regional watershed management, multi-use lakes, wetlands and stream restorations.

4. *Existing Sources*

Continued grants from state and federal sources, such as Clean Water Act Section 319 Nonpoint Source monies for park construction and Surface Transportation Project (STP) funding for roadway projects, have assisted with capital and demonstration projects that helped establish Lenexa's Rain to Recreation program. Other sources of funding also support Lenexa's stormwater program, including Johnson County Stormwater Management Advisory Council (SMAC) funding supported by a 1/10th cent sales tax and basic permitting fees charged to developers.

For more information on Lenexa's programs, contact:
Michael Beezhold
Watershed Manager
Public Works Department
City of Lenexa
(913) 477-7680
mbeezhold@ci.lenexa.ks.us
www.raintorecreation.org

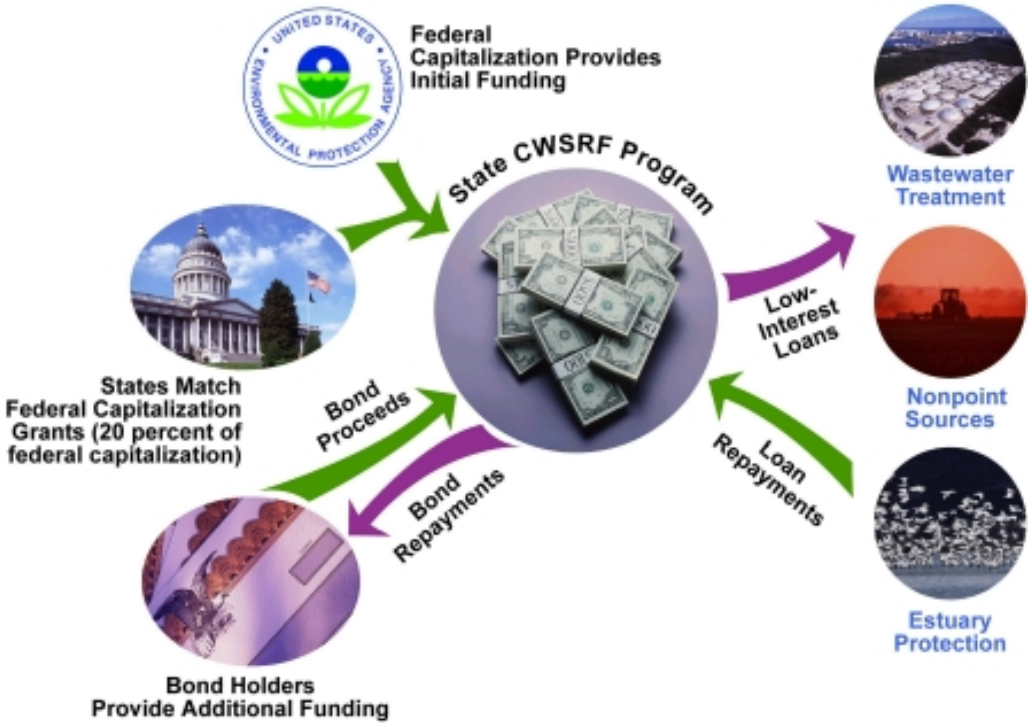
Loan Programs

In situations where the creation of a stormwater utility is impractical, loan programs provide another funding option for communities looking to finance green infrastructure projects. There are currently a variety of federal and state loan programs that can be used to help pay for stormwater infrastructure. One of the largest, most readily available sources of funding for green infrastructure implementation is the US Environmental Protection Agency (EPA) Clean Water State Revolving Fund (CWSRF).

Background

The CWSRF is a powerful financing program that provides funding for wastewater treatment, stormwater management, nonpoint source abatement and estuary protection projects. Today, all 50 states and Puerto Rico operate successful CWSRF programs that have provided over $63 billion in financial assistance since 1988, with funding generally provided in the form of low interest loans. In 2007 alone, $5.3 billion was provided to fund a wide variety of projects that protect or improve national water quality. At present, only a small percentage of the CWSRF has been used for green infrastructure projects; however a growing number of states are beginning to implement green stormwater technologies with CWSRF loans.

The working framework of the CWSRF is relatively simple. Each year, funds to establish or capitalize the CWSRF program are provided to states through EPA grants. In addition, states add matching funds which are then loaned to a wide variety of water quality improvement projects. Although there is no federal requirement to do so, these loans are usually paid off over 20 years or the useful life of the project - which ever is less - with repayment commencing within one year of project completion. To complete the cycle, loan payments, interest and new capitalization grants are reincorporated into the fund and used for new projects. This is the basis of the revolving funding program.



Benefits

The CWSRF is an attractive financing option for a number of reasons. For one, CWSRF money is readily available and can be used for a wide variety of projects, both large and small. State managers of the CWSRF program are very innovative and can often leverage available resources to meet the fluctuating demand for funding. In addition, the CWSRF is also an affordable way to finance projects that improve water quality. Though the money provided is not free, CWSRF loans can have interest rates as low as 0%, and repayment can begin up to one year after a project is complete. Even better, CWSRF loans can cover 100% of a project's costs with no matching requirement on behalf of the borrower. Finally, the CWSRF is a very flexible program. There are countless ways to structure funding agreements, and states have wide latitude to set interest rates and repayment terms. In many cases, funds to repay CWSRF loans are generated by the project itself. For instance, wastewater user fees can be used to repay loans to publicly owned treatment works (POTWs). That said, funds do not necessarily have to come directly from the project, and it is perfectly acceptable for loan repayment to come from unrelated funding sources, such as:

- Stormwater Fees
- Homeowner Fees
- Recreational or License Fees
- Dedicated Portion of State, County, Town, or Special District Fees or Taxes
- Donations or Membership Dues made to Nonprofit Organizations
- Individual or Business Revenues

Eligibility

The CWSRF has broad authority to fund watershed projects directly related to (1) POTWs, (2) implementation of a state's Nonpoint Source Management Plan, and (3) development and implementation of a National Estuary's Comprehensive Conservation Management Plan (CCMP). The key to eligibility is determining which of these three authorities apply to a project, if any. Of prime concern for green infrastructure projects is whether the project is located in a community that is regulated under the National Pollutant Discharge Elimination System (NPDES) stormwater program and, if so, identifying what the NPDES permit specifically requires of the community.

Permitted Communities: If a community is permitted for stormwater, it is considered a point source, and therefore projects may be funded as POTWs. These types of projects must be publicly owned. If a community is permitted and the project is not specifically required by a draft or final NPDES permit, it may be funded as a nonpoint source project if it is consistent with a state's Nonpoint Source Management Plan. Nonpoint source projects may be publicly or privately owned.

Non-Permitted Communities: If a community does not have a draft or final NPDES stormwater permit or is exempt from permitting, the project may be funded as a nonpoint source project under a state's Nonpoint Source Management Plan and can include publicly or privately owned projects. Additionally, any public or private project may be funded as an estuary project if the project is located in a National Estuary's watershed and is sanctioned by the Estuary's CCMP.

Green Infrastructure Funding

Under current regulations, the CWSRF can fund only the "capital costs" of a water quality improvement project. However, the CWSRF's definition of capital costs is very broad. In addition to traditional infrastructure expenditures on pipes, pumps and treatment plants, capital costs also include

things like land conservation, tree plantings, equipment purchases, environmental cleanups and even the development and initial delivery of environmental education programs. One of the few things the CWSRF cannot fund is the operation and maintenance costs of a project, such as periodic cleaning of pervious pavement.

Some examples of green infrastructure projects that are eligible for CWSRF assistance include:

Land Conservation	Wetland Restoration
Reforestation	Parks & Greenways
Tree Boxes	Rain Gardens & Bioinfiltration Practices
Cisterns & Rain Barrels	Permeable Pavements
Downspout Disconnections	Green Roofs

In addition to providing funding for green infrastructure projects, the CWSRF can also help reduce the risk associated with the performance of green infrastructure practices. Some communities may be reluctant to try these relatively new stormwater management technologies because of concerns that they may fail to perform as expected. Fortunately, there is a simple way to ease these concerns. Many states currently charge additional fees on their CWSRF loans, known as non-program income, which can be used for a wide range of purposes. Using this additional source of income, states may pay for insurance that can cover the risk associated with the performance of newer green technologies. If there is sufficient non-program income, states can also use these funds to replace a particular technology that fails to perform adequately.

Helpful Hint: By incorporating green infrastructure into traditional stormwater infrastructure projects, POTWs can use CWSRF funds to pay for land acquisitions in public right-of-ways that would not otherwise be authorized. Here is how:

Under current regulations, POTWs cannot receive CWSRF funding for land, including right-of-ways, unless that land is integral to the wastewater treatment process. However, percolation of stormwater through the soil matrix is often essential to the operation of green infrastructure practices, many of which can be conveniently located in public right-of-ways. Thus, because green infrastructure practices can utilize the soils and plants in a right-of-way to clean and infiltrate stormwater, the land in that right-of-way becomes integral to the treatment process and is therefore eligible for CWSRF funding.

Case Study: Ohio CWSRF Program

The Ohio CWSRF program recently provided over $1.1 million in low interest loans to Hidden Creek, Ltd., a residential development company, to fund the installation of a variety of green infrastructure practices that protect the Big Darby Creek watershed – one of the highest-quality aquatic ecosystems in the United States. Home to 25 rare or endangered species, this watershed encompasses 557 square miles in central Ohio and has been recognized as one of The Nature Conservancy's "Last Great Places" in the western hemisphere.

When a large tract of highly sensitive agricultural land within this watershed was put up for sale, Hidden Creek Ltd. bought the property and designed a housing project to demonstrate that development can be both environmentally sensitive and financially profitable.

With the help of CWSRF funds, a comprehensive set of actions were taken to limit the amount of runoff generated from the development project, including the construction of vegetated swales for stormwater treatment, restoration of wooded stream buffers, and the establishment of emergent wetland habitat. In addition, 230 acres of the riparian stream corridor within the development have been protected via a conservation easement held by the Natural Resources Conservation Service. A program has also been developed to educate homeowners and housing contractors about watershed protection and related deed restrictions attached to each property. Hidden Creek, Ltd. received a national wetland award for land stewardship and development from the Environmental Law Institute for their watershed protection efforts, and has repaid the CWSRF loans with revenues from the sale of the housing lots.

The Big Darby Creek watershed provides habitat for 86 species of fish, 35 species of reptiles, and 170 species of birds.
Photo credit: Duane Hook

Resources

University of Maryland, Environmental Finance Center.
http://www.efc.umd.edu/

Florida Stormwater Association, *Establishing a Stormwater Utility*.
http://www.florida-stormwater.org/manual.html

National Association of Flood and Stormwater Management Agencies, *Guidance for Municipal Stormwater Funding.*
http://www.nafsma.org/Guidance%20Manual%20Version%202X.pdf

Black and Veatch Stormwater Utility Survey 2007
http://www.bv.com/Downloads/Resources/ems_brochures/rsrc_2007StormwaterUtilitySurvey.pdf

EPA's Financial Assistance Comparison Tool (FACT)
www.epa.gov/owm/cwfinance/cwsrf/fact.htm

EPA's Guidebook of Financial Tools
www.epa.gov/efinpage/guidebook.htm